



# UNITED STATES PATENT AND TRADEMARK OFFICE

*Coln*

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/631,271	07/31/2003	Robert M. Montgomery	GCSD-1231 (51310)	3783
------------	------------	----------------------	-------------------	------

27975	7590	06/09/2005
-------	------	------------

ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST P.A.  
1401 CITRUS CENTER 255 SOUTH ORANGE AVENUE  
P.O. BOX 3791  
ORLANDO, FL 32802-3791

EXAMINER
----------

ANDERSON, DENISE BROWN

ART UNIT	PAPER NUMBER
----------	--------------

2877

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/631,271

Applicant(s)

MONTGOMERY, ROBERT M.

Examiner

Denise B. Anderson

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 February 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 11-16, 23-29, 35, 37 and 38 is/are rejected.
- 7) ☒ Claim(s) 5-10, 17-22, 30-34 and 36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                    |                                                                             |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                | Paper No(s)/Mail Date. _____                                                |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>7/31/03</u> .                                                             | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) filed on 7/31/03 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but a copy of the "Tiziani" reference was not included.

### ***Specification***

2. The title of the invention does not comply with 37 CFR 1.72(a). The title is objected to because it is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed (i.e., distinguish the apparatus from other optical profilers). The examiner respectfully suggests changing the title to the following: "Optical profiling apparatus for detecting and adjusting shape distortions and associated methods". Correction is required. See MPEP § 606.

### ***Claim Objections***

3. Claim 4 is objected to because of the following informalities: it cannot be ascertained from the claim how the "source" tilts the wavefront of the reference beam. In the specification (page 12, paragraph 0038), the applicant states that "the reference beam 36 is inserted at a sufficient angle or tilt to provide a single cycle of the fringe pattern across the image of a single lenslet", giving the impression that the tilting is performed by some other structure of the invention. Based on the explanation in the specification, the examiner interprets that the applicant has structure for tilting the

Art Unit: 2877

wavefront that does not correspond to the source itself. Appropriate correction is required.

4. Claim 29 is objected to because of the following informalities: it cannot be ascertained from the claim whether the applicant means to tilt the wavefront of the transmitted beam or the reference beam (as described in claim 4 and on page 12 of the specification). Based on the specification, the examiner interprets that the applicant intends to tilt the wavefront of the "reference" beam and not the wavefront of the "transmit" beam. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 11, 13, 14, 27, 35, 37, and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Hochberg et al (US Patent No. 5,071,251).

6. As to claim 1, the applicant claims a detector, a source, and at least one optical element. In Figure 1 Hochberg et al discloses a detector (22), a source (32,34), and multiple optical elements (36, 38, 40, 42, 12, 14, 16, 18, 24, and 26). Also in Figure 1, illumination system (30) produces a unitary beam from 2 lasers (plurality of wavelengths), which is then split by beamsplitter (24) into transmit and reference beams. Focusing surface (14) directs the transmit beam to the target (28) and directs the resulting reflected transmit beam from the target to the optical detector (22) via

beamsplitter (24), which then combines the reference beam (from reference surface 18) and reflected transmit beam to produce a profile of the target based on the fringe contrast of the two wavelengths (column 5, lines 41-56).

7. As to claim 2, the applicant claims that the optical source comprises a plurality of lasers and a multiplexer. In Figure 1, Hochberg et al discloses 2 lasers (32, 34) and an illumination subsystem (30) for producing a unitary beam from the 2 lasers. The illumination subsystem functions as a multiplexer, combining the 2 laser beams into a unitary beam (column 4, lines 53-61).

8. As to claim 11, the applicant claims a detector with a processor. Hochberg et al discloses a detector (column 3, line 7) and processing means (column 3, lines 19-21 and column 6, lines 28-32) for computing the distance based on the amplitude of the fringe contrast (column 5, lines 50-54).

9. As to claim 13, the applicant claims that the detector comprises a CCD. Hochberg et al discloses a CCD in column 3, line 4.

10. As to claim 14, the applicant claims a single exposure of the CCD. Hochberg et al suggests a single exposure of the CCD since an entire surface of the object is being imaged onto the detector (as two examples see column 7, lines 32-33 and column 8, lines 61-64).

11. As to claim 27, the applicant claims a method in which transmit and reference beams are generated, transmit beam is directed to the target and reflected off the target to a detector and combined there with the reference beam to establish a profile of the

Art Unit: 2877

target based on fringe contrast. Everything claimed in claim 27 has already been claimed in claim 1, which has been rejected (see paragraph 6 above).

12. As to claim 35, the applicant claims a method for computing distance. Hochberg et al discloses a detector (column 3, line 7) and processing means (column 3, lines 19-21 and column 6, lines 28-32) for computing the distance based on the amplitude of the fringe contrast (column 5, lines 50-54).

13. As to claims 37 and 38, the applicant has claimed the CCD and a single exposure. Hochberg et al discloses a CCD in column 3, line 4. Hochberg et al suggests a single exposure of the CCD since an entire surface of the object is being imaged onto the detector (as two examples see column 7, lines 32-33 and column 8, lines 61-64).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 3, 4, 12, 15, 16, 23-26, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hochberg.

15. As to claims 3, 15, 23, 25, 26, and 28 the applicant further claims a delay circuit. Hochberg et al does not expressly disclose a delay circuit. However, the reference arm created by reference mirror 18 serves the same purpose as the delay circuit claimed by the applicant. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a delay circuit for the purpose of splitting the reference beam from

Art Unit: 2877

the transmit beam, as is customarily done in an interferometer, for later combining the beams so that they interfere.

16. As to claims 12 and 24, the applicant claims the basis for computing a distance to the target based on the amplitude of the fringe contrast in a ratio of peak-to-peak and average intensities. Hochberg et al discloses all of the same structure that has been claimed by the applicant (see claims 1 and 11). Hochberg et al does not expressly disclose that the structure performs the same functions as claimed by the applicant. However, since the same structure is disclosed by Hochberg et al, it would be capable of performing the same functions as is claimed by the applicant. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the structure that Hochberg et al discloses with the computation method that the applicant claims for the purpose of computing a distance to a target.

17. Claims 4, 16, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hochberg et al further in view of Ge (US Patent Application Publication 2001/0049709). The applicant claims wavefront tilting. Hochberg discloses the claimed invention except for wavefront tilting. Ge discloses wavefront tilting (paragraph 0005). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Hochberg et al with those of Ge to tilt a reference wave front for the purpose of reading out information items smaller than a single strip of interference fringe (i.e., one fringe), thereby more accurately measuring a surface.

***Allowable Subject Matter***

Art Unit: 2877

18. Claims 5-10, 17-22, 30-34 and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

19. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record, taken alone or in combination, fails to disclose or render obvious a lenslet array (claims 5, 8, 17, 20, 30, and 33), a plurality of reflectors (claims 6, 18, and 31), a mirror with an opening (claims 9, 21, and 34) and a computational method involving comparing peak-to-peak and average intensities (36). Claims 6, 7, 8, 10, 18, 19, 20, 22, and 31-33 are also objected to because they depend from objected claims 5, 9, 17, and 30.

### ***Conclusion***

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

DeGroot (US Patent No. 5,153,669) discloses a three-wavelength optical measurement apparatus and method.

Meyer et al (US Patent No. 6,181, 430) discloses an optical device for measuring a surface characteristic of an object by multi-color interferometry.

### ***Fax/Telephone Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise B. Anderson whose telephone number is 571-272-8324. The examiner can normally be reached on Mon-Fri (9:30 AM - 6 PM).



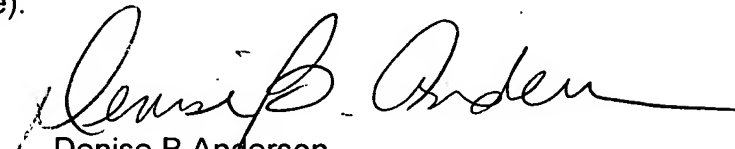
Art Unit: 2877

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



DBA



Denise B Anderson  
Examiner  
Art Unit 2877



Gregory J. Toatley Jr.  
Supervisory Patent Examiner  
Art Unit 2877

*Feb 2006*